Claims:

1. A method of subjecting a glass preform to processing by tensile forces in a furnace to produce a glass product of predetermined shape, according to which method

- at least a part of the glass preform is introduced into the furnace through an inlet opening,
- a portion of the glass preform introduced into the furnace is heated to a temperature above the softening point of the glass,
- the heated portion of the glass preform is subjected to tensile forces in a drawing direction to process the preform into the predetermined shape,
- the portion of the preform which has been processed into the predetermined shape is drawn from the furnace through an outlet opening, and
- the heated portion of the preform and at least a part of the processed portion of the preform are flushed in the furnace with inert gas which is being fed into the furnace,

characterized by

- maintaining the concentration of gaseous impurities in the furnace essentially on the same level as the concentration of the same impurities in the inert gas fed into the oven,
- establishing a diffusion barrier against the inflow of undesired gaseous components from the ambient air, driven by the forces of diffusion, by generating a barrier flow of inert gas in at least one opening selected from said inlet opening and said outlet opening of the furnace, said barrier flow having a direction of flow, which is generally opposite to the direction of the diffusion.

2. The method according to claim 1, wherein the furnace comprises an elongated furnace chamber having a vertical central axis, said diffusion barrier being established in the inlet opening, which is located in the upper end of the elongated furnace chamber.

3. The method according to claim 1 or 2, wherein a diffusion barrier is established in the inlet opening of the glass preform, in the inlet opening of the inert gas feed and in the outlet opening of the processed preform.

4. The method according to claim 2, wherein the gas flow through the inlet opening of the glass preform corresponds to the equation (2)

$$F1=F*C1/(C1+C2). \qquad (2)$$

wherein

F1 stands for the gas flow through the inlet opening,

F stands for the total gas flow,

C1 stands for the conductance of the inlet opening and

C2 stands for the conductance of the outlet opening

5. The method according to claim 4, wherein the each of the conductances C1 and C2 is be calculated from the equation (3)

$$C=K\ W*H^3/L, \qquad (3)$$

wherein

C stands for conductance,

K is a constant at low pressure differences,

W is the width of the opening,

H is the height of the opening, and

L is the length of the opening

6. The method according to any of claims 1 to 5, wherein the flow of inert gas through the opening is at least equal to the flow of gas caused by the chimney effect through the inlet opening.

7. The method according to claim 6, wherein the flow or inert gas into the heating oven is sufficient still to form, based on the gas distribution according to equation (2), a diffusion barrier at the outlet opening of the processed preform.

8. The method according to claim 7, wherein the outlet opening will allow for more free flow of gas than the inlet opening to direct most of the inert gas flow fed into the oven through the outlet opening.

9. The method according to any of claims 3 to 8, wherein the conductance of the outlet opening is greater than the conductance of the inlet opening.

10. The method according to any of the preceding claims, wherein the inert gas fed into the heaving oven is equal to or greater than the flow of gas caused by the chimney effect + 1 SLM, in particular chimney effect + 5 SLM.

11. The method according to any of the preceding claims, wherein the glass preform is

subjected to tensile drawing in order to stretch the preform into a shape suitable for post-processing like drawing of optical fibres.

12. The method according to any of claims 1 to 10, wherein the glass preform is subjected to drawing of optical fibre.

13. The method according to claim 12, wherein the clearance between the exterior diameter of the glass preform and the inlet opening diameter is 0.1 – 10 mm for an 80 mm preform.

14. The method according to claim 12, wherein there is a barrier flow along a barrier distance of 0.5 to 100 mm.

15. The method according to any of claims 1 to 14, wherein the furnace comprises a graphite induction furnace.

16. The method according to any of the preceding claims, comprising rotating the glass preform about its central axis during heat-processing in the furnace.

17. An apparatus for heating of glass performs which are processed by tensile forces into a glass product of predetermined shape, comprising

- a furnace body having a jacket defining an elongated furnace chamber with an at least essentially circular cross-section perpendicular to the central axis of the chamber,
- a first opening at one end of the chamber for receiving one end of a glass preform, which is to be processed,
- a second opening at an opposite end of the chamber for withdrawal of the processed glass product,
- graphite heating resistances mounted to the furnace chamber to provide for induction heating of the glass preform in the furnace, and
- feed nozzles connected to at least the first opening of the chamber for introducing protective gas into the furnace chamber,

c h a r a c t e r i z e d by

- a first diffusion barrier zone at the first opening for preventing inflow of undesired gaseous components from the ambient air, driven by the forces of diffusion, into the furnace chamber during heating of the glass preform.

18. The apparatus according to claim 17, wherein there is a second diffusion barrier zone at the second opening of the furnace chamber.

19. The apparatus according to claim 17 or 18, wherein a nozzle for feed of protective gas is connected to both the first and the second openings and, optionally, also to an opening formed in the jacket of the furnace chamber at a point between the first and the second openings.

20. The apparatus according to any of claims 17 to 19, wherein the apparatus is adapted for heating of a glass preform subjected to drawing of optical fibre.

21. The apparatus according to claim 20, wherein the clearing between the exterior diameter of the glass preform and the inlet opening diameter is 0.1 – 10 mm for an 80 mm preform.

22. The apparatus according to claim 21, wherein the each barrier zone comprises a length of the furnace chamber amounting to 0.5 to 100 mm, along which a barrier flow of protective gas can be arranged.

23. The apparatus according to any of claims 17 to 22, wherein the barrier zone comprises a zone of essentially laminar gas flow.

24. The apparatus according to claim 23, wherein the barrier zone is formed above the feed nozzles of the protective gas.

25. The apparatus according to any of claims 17 to 24, wherein the barrier zone is defined by the clearance between a glass preform and the opening of the furnace.

26. The apparatus according to claim 25, wherein the difference between the external diameter of the glass preform and inner diameter of the opening is in the range of 0.5 to 15 mm.

27. The apparatus according to any of claims 23 to 26, wherein the barrier zone has a length parallel to the central axis of the furnace tube amounting to about 10 to 1000 mm, preferably about 15 to 150 mm.

28. A process for heat-treatment of glass substrates, in which method the glass substrate is placed in a first gas space of a heat treatment zone, surrounded by a second, ambient gas space, said heat treatment zone being provided with at least one gas conduit interconnecting the first and the second gas spaces, c h a r a c t e r i z e d by forming a

diffusion barrier in the at least one gas conduit interconnecting the gas space inside the heat treatment device with the ambient atmosphere to seal off the conduit against flow of gas in at least one direction through the conduit.

29. The process according to claim 28, comprising establishing a diffusion barrier against the inflow or outflow of undesired gaseous components from or to the ambient air, driven by the forces of diffusion, by generating a barrier flow of inert gas in at least one gas conduit selected from said inlet opening and said outlet opening of the furnace, said barrier flow having a direction of flow, which is generally opposite to the direction of the diffusion.

30. The process according to claim 28 or 29, comprising establishing a diffusion barrier in each of the gas conduits interconnecting the first and the second gas spaces.

31. The process according to any of claims 28 to 30, wherein the heat treatment comprises preform processing by Modified Chemical Vapour Deposition in an MCVD lathe.

32. The process according to any of claims 28 to 30, wherein the heat treatment comprises preform processing in a sintering furnace.

33. The process according to any of claims 28 to 32, wherein the diffusion barrier is established at a gas conduit comprising a rotary joint.

34. The process according to claim 33, wherein the rotary joint is a non-contacting joint.